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THE
ONTARIO WATER RESOURCES
COMMISSION
REPORT ON
WATER POLLUTION SURVEY
TOWN OF ACTON

1964

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Report on water pollution
survey, town of Acton.
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REPORT ON

WATER POLLUTION SURVEY

TOWN OF ACTON

BY

ONTARIO WATER RESOURCES COMMISSION

April 1964

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INTRODUCTION

The purpose of this survey was to assess the conditions in the vicinity of the Town of Acton with reference to the pollution of Black Creek, and the contamination of ground and surface waters by wastes from a local tannery.

Water pollution surveys of this type are made routinely and upon request by the Ontario Water Resources Commission, and are designed to locate any existing or potential sources of water pollution. When sources of pollution are revealed, corrective measures are recommended.

In difficult situations, the laboratory and research services of the OWRC are available to assist in the determination of a satisfactory remedy.

GENERAL INFORMATION

Acton, with a population of 4,354, is located at the junction of Highways Nos. 7 and 25 in the north-central part of Halton County. It is situated approximately 44 miles west of Toronto, 15 miles east of Guelph, and 34 miles north-east of Hamilton.

There are a number of diversified industries in Acton, the largest being Beardmore & Company Limited.

1. Water Supply

Water for the municipal system is supplied from two wells designated as Well No. 1 and Well No. 2.

Well No.1 which is also referred to as the Second Line Well is located on Main Street North adjacent to Micro Plastics Limited. This supply is not treated. Well No.2 which is known locally as the Third Line Well is located on Churchill Road North, and is the main source of supply. This supply is chlorinated.

2. Drainage

Drainage for Acton is provided by Black Creek. This watercourse originates upstream from the municipality and forms an irregularly shaped body of water in Acton known as Fairy Lake.

Black Creek, after traversing the town, flows in a general easterly course before joining Silver Creek a short distance downstream from Georgetown. Silver Creek continues to its confluence with the Credit River at Norval.

3. Sewer System

The Town of Acton is served by a separate system of sewers.

The sanitary sewer system serves all of the developed portion of Acton with the exception of the Beardmore & Company Limited plant which disposes of its tannery wastes on company property. The treatment and disposal of these wastes is effected by means of holding ponds and spray irrigation.

Part of the municipality is provided with storm sewers, and the remaining sections have open ditches to collect storm water.

4. Refuse Disposal

Garbage and refuse collected in Acton is disposed of by the burn and cover method at a site near the Acton Water Pollution Control Plant. This area appears to be sufficiently isolated from a watercourse and no water pollution problem is anticipated.

SEWAGE TREATMENT FACILITIES

Sewage from Acton is treated by means of an activated sludge water pollution control plant located in the south-eastern part of the town.

The details of the plant are briefly described as follows:

Design Capacity gpd 250,000

Treatment - comminution, primary sedimentation,
mechanical aeration, final
sedimentation, sludge digestion,
chlorination(year-round)

Receiving Stream - Black Creek

1962-63 (September 5-July 25)

No.of Samples 6

Raw Sewage

BOD Average ppm 220

Suspended Solids Average ppm 225

Final Effluent

BOD Average ppm 36.2

Suspended Solids Average ppm 35.7

BOD Reduction % 83.5

Suspended Solids Removal % 84.1

Flow & Treatment Data
1963 (January 1-July 1)

Total Flow	gal.	44,302,300
Average Daily Flow	gal.	245,000

Comments

On the basis of these results, the biochemical oxygen demand and the suspended solids content of the effluent from the Acton Water Pollution Control Plant were excessive.

Infiltration into the sanitary sewer system presents a major problem insofar as the operation of the plant is concerned.

Activated sludge recirculation cannot be reduced to desirable levels, thus creating an additional hydraulic loading on the secondary treatment facilities.

In addition to the above shortcomings, the sludge digester cannot be heated adequately.

ANALYSES OF SAMPLES

The laboratory results of bacteriological examinations and chemical analyses of samples collected from Black Creek and from the sewer outlets discharging a dry weather flow are presented in Table 1 which is appended to this report.

All of the examinations and analyses were performed at the Ontario Water Resources Commission laboratory in Toronto.

A plan of Acton showing the approximate locations of the sampling points and sewer outlets is enclosed at the back of this report.

1. Significance of Laboratory Results

The OWRC objectives for surface waters in Ontario are as follows:

5-Day Biochemical Oxygen Demand (BOD) - not greater than 4 ppm
Membrane Filter (MF) Coliform Count - not greater than 2,400
coliforms per 100 ml

Phenolic Equivalents:

Average - not greater than 2 ppb

Maximum - not greater than 5 ppb

pH Range- 6.7 - 8.5

Some pertinent maximum allowable concentration limits of contaminants in storm sewer, sewage treatment plant and industrial waste discharges are listed below. Adequate protection for surface waters, except in certain specific instances influenced by local conditions, should be afforded if the following concentrations and pH range are not exceeded:

5-Day BOD	-	15 ppm
Suspended Solids	-	15 ppm
Phenolic Equivalents	-	20 ppb
Ether Solubles(oil)	-	15 ppm
pH Range	-	5.5 - 10.6

The results indicated that the bacterial quality of the water was highly variable and while many of the counts were satisfactory, several failed to meet the Commission's objective.

Apart from water contamination associated with tannery wastes, the most significant pollution was indicated in the vicinity of Main Street (south), and downstream from the Acton Water Pollution Control Plant outfall sewer.

WATER IMPAIRMENT

Aside from the Acton Water Pollution Control Plant which has been previously described, the sources of potential and existing water pollution originating in Acton are as follows:

1. Industrial Wastes:

(i) Beardmore & Company Limited

Beardmore & Company Limited operates a large tannery in Acton which is engaged in both vegetable and chrome tanning of cattle hides for the production of sole and upper shoe leather.

For many years, the discharges of industrial wastes from this plant into Black Creek have caused pollution problems and complaints from riparian owners. There are a number of reports on file, dating from 1930, referring to complaints dealing with fish-kills, odours, and even the death of three cows; all attributed to the discharge of tannery wastes into Black Creek.

One of the most disastrous incidents was recorded in the spring of 1946 when a break occurred in a dam on the tannery property resulting in an estimated spill of 25 million gallons of wastes into Black Creek. In addition to causing considerable flooding of properties downstream and destroying much of the fish life in the creek, the flood also inundated a pumphouse which provided water for the Town of Acton.

While the volume of wastes discharged to Black Creek from Beardmore & Company Limited has decreased considerably since 1946, new problems have arisen from the disposal of these wastes by means of spray irrigation.

Water Supply

The water supply for the varied operations carried out in the tannery is obtained from Fairy Lake and wells located on the property. The consumption as estimated from the pump capacity averages 700,000 gpd.

Disposal of Wastes

Wastes from all divisions of the tannery, except the vegetable tanning section but including domestic sewage, are pumped, or flow by gravity, to a large sump. The combined wastes from the sump flow through two primary sedimentation ponds operated in series. A major portion of the suspended solids is removed by these units. Retention time averages four days in these primary ponds and suspended solids are reduced from an average of 4,000 ppm to 500 ppm resulting in an 87.5 per cent reduction. Storage in other ponds over a period of days, or weeks, further reduces the suspended solids to approximately 200 ppm. The wastes are then pumped from these large storage lagoons and applied by spray irrigation to adjacent farmland owned by the company.

A chemical analysis of the admixture prior to primary treatment may indicate the following composition:

Total Solids	-	10,000 ppm
Suspended Solids	-	4,000 ppm
Dissolved Solids	-	6,000 ppm
5-Day BOD	-	600 ppm
pH	-	9 - 10.5

Sodium chloride makes up the major component of the dissolved solids.

During the winter months, the effluent from the primary ponds is stored in several lagoons with a total holding capacity exceeding 50 million gallons. These accumulated wastes, together with the daily summer flow, are then disposed of by an intensive spring, summer, and fall spraying programme. To supplement this spray irrigation programme, approximately five acres of land are kept under cultivation for disposal of the lagooned vegetable tanning wastes by ridge and furrow ploughing. Seepage and evaporation from the lagoons also aid in the disposal. The effluent from the vegetable tanning process is a dark-brown liquor having a pH value of 4.0 to 5.0. It has a tendency to be toxic to vegetation.

Stabilization Ponds

It is noted that a small percentage of mixed wastes is partially chlorinated to remove sulphides and fed into the stabilization ponds. Overflow from these ponds drains into a swampy area which is tributary to Black Creek.

Ground Water Contamination

Apart from causing pollution of surface waters, the effects of ground-water contamination from Beardmore & Company Limited have been studied by the OWRC.

Contamination of South Springs

Prior to 1960, water for the Acton municipal system was supplied from three sources, one of which was a spring supply

referred to as "South Springs". The latter is located approximately one mile south-east of the town.

In 1957, a marked change was noticed in the chemical quality of the water from south springs. It is noted in a report dated February 5, 1958, that the samples collected from this source showed a hardness greater than 700 ppm, and a chloride content of 800 ppm. The report suggested that the impounding and spraying of tannery wastes were the most logical causes of the increase in hardness and chlorides.

The Ground Water Branch of the Commission reported that the ground in the spray area was composed mainly of porous gravel-like material which would allow any liquids to penetrate rapidly. At the same time, it was indicated that the salt content and the hardness in the water from the springs would not likely improve until the spraying and impounding of tannery wastes was terminated in the fields north-west of the springs.

The chloride content of a number of samples collected at south springs between July 1955 and July 1960 are presented as follows:

<u>Date Collected</u>		<u>Chlorides</u>
July 13, 1955	Acton Springs	11 ppm
March 20, 1956	South Springs	225 ppm
December 2, 1957	Spring flow beside pumphouse	788 ppm
	South pumping station	670 ppm

<u>Date Collected</u>		<u>Chlorides</u>
December 31, 1957	South spring reservoir	810 ppm
	South spring- open stream	770 ppm
January 16, 1958	Open spring beside reservoir	770 ppm
January 30, 1958	Open spring beside reservoir	750 ppm
February 18, 1958	Open spring beside reservoir	760 ppm
February 27, 1958	Open spring beside reservoir	700 ppm
March 12, 1958	Open spring beside reservoir	750 ppm
March 27, 1958	Open spring beside reservoir	730 ppm
April 11, 1958	Open spring beside reservoir	600 ppm
April 25, 1958	Open spring beside reservoir	620 ppm
May 6, 1958	Open spring beside reservoir	575 ppm
July 15, 1958	Open spring beside reservoir	620 ppm
August 27, 1958	Open spring beside reservoir	830 ppm
October 6, 1958	Open spring beside reservoir	868 ppm
November 25, 1958	Open spring beside reservoir	1058 ppm
December 15, 1958	Open spring beside reservoir	1192 ppm
January 8, 1959	Open spring beside reservoir	1020 ppm
January 21, 1959	Open spring beside reservoir	1095 ppm
February 10, 1959	Open spring beside reservoir	836 ppm
February 26, 1959	Open spring beside reservoir	1130 ppm
March 10, 1959	Open spring beside reservoir	1005 ppm
March 24, 1959	Open spring beside reservoir	997 ppm
April 8, 1959	Open spring beside reservoir	860 ppm
April 21, 1959	Open spring beside reservoir	900 ppm
May 12, 1959	Open spring beside reservoir	755 ppm
May 27, 1959	Open spring beside reservoir	719 ppm
June 8, 1959	Open spring beside reservoir	688 ppm
June 22, 1959	Open spring beside reservoir	753 ppm

<u>Date Collected</u>		<u>Chlorides</u>
July 7, 1959	Open spring beside reservoir	706 ppm
July 28, 1959	Open spring beside reservoir	715 ppm
August 12, 1959	Open spring beside reservoir	790 ppm
August 24, 1959	Open spring beside reservoir	826 ppm
September 9, 1959	Open spring beside reservoir	854 ppm
September 12, 1959	Open spring beside reservoir	886 ppm
September 21, 1959	Open spring beside reservoir	875 ppm
September 24, 1959	Open spring beside reservoir	882 ppm
September 28, 1959	Open spring beside reservoir	900 ppm
October 1, 1959	Open spring beside reservoir	898 ppm
October 5, 1959	Open spring beside reservoir	907 ppm
October 8, 1959	Open spring beside reservoir	923 ppm
October 13, 1959	Open spring beside reservoir	926 ppm
October 16, 1959	Open spring beside reservoir	932 ppm
October 19, 1959	Open spring beside reservoir	924 ppm
October 22, 1959	Open spring beside reservoir	940 ppm
October 28, 1959	Open spring beside reservoir	976 ppm
November 4, 1959	Open spring beside reservoir	1008 ppm
November 12, 1959	Open spring beside reservoir	1020 ppm
November 18, 1959	Open spring beside reservoir	1025 ppm
November 25, 1959	Open spring beside reservoir	1040 ppm
December 4, 1959	Open spring beside reservoir	1026 ppm
December 18, 1959	Open spring beside reservoir	1072 ppm
December 30, 1959	Open spring beside reservoir	1084 ppm
January 6, 1960	Open spring beside reservoir	1090 ppm
January 12, 1960	Open spring beside reservoir	1095 ppm
January 25, 1960	Open spring beside reservoir	1105 ppm
January 29, 1960	Open spring beside reservoir	1115 ppm
February 5, 1960	Open spring beside reservoir	1065 ppm
February 11, 1960	Open spring beside reservoir	1030 ppm
February 18, 1960	Open spring beside reservoir	1060 ppm
February 25, 1960	Open spring beside reservoir	1061 ppm
March 23, 1960	Open spring beside reservoir	1006 ppm
April 4, 1960	Open spring beside reservoir	936 ppm
April 20, 1960	Open spring beside reservoir	936 ppm
April 27, 1960	Open spring beside reservoir	841 ppm

Date Collected		Chlorides
May 4, 1960	Open spring beside reservoir	801 ppm
May 13, 1960	Open spring beside reservoir	741 ppm
May 25, 1960	Open spring beside reservoir	591 ppm
June 7, 1960	Open spring beside reservoir	571 ppm
June 16, 1960	Open spring beside reservoir	546 ppm
June 22, 1960	Open spring beside reservoir	546 ppm
June 29, 1960	Open spring beside reservoir	536 ppm
July 12, 1960	Open spring beside reservoir	546 ppm
July 22, 1960	Open spring beside reservoir	521 ppm
July 28, 1960	Open spring beside reservoir	511 ppm

The chlorides in the samples collected from 1959 to 1962 inclusive are shown graphically on the appended graphs 1 - 4.

Discussion

It is noted from the above tabulation that the chloride levels in the south springs water increases sharply from 11 ppm in 1955 and 225 ppm in 1956 to greater than 800 ppm in 1957. The chloride contents reached a peak of approximately 1200 ppm in December 1958 followed by gradual decrease to approximately 700 ppm during July 1959 and then the concentration rose steadily to 1084 ppm towards the latter part of December 1959.

In 1960, the chloride level dropped to slightly less than 500 ppm. Since September 1960, the level fluctuated between a minimum of 521 ppm and a maximum of 816 as recorded on the attached graphs 2 - 4. For comparison purposes, the Commission objective maximum for a chloride concentration in a water supply is 250 ppm.

An interesting aspect of this investigation is that the water from spring No. 2 has remained relatively free of chloride

contamination. This spring is located approximately 150 feet south-west of the main springs. The volume of flow from this spring is much less and it was piped into the main reservoir. This would indicate that the aquifer feeding this supply was not affected by the spraying operations.

Application of Fluorescent Tracer Dyes

In order to confirm the source of chloride contamination in the municipal water supply, it was decided to apply small amounts of fluorescent tracer dyes directly on the fields adjoining the south springs. During a 5-week period in September and October 1959, a total of 5 pounds of sodium fluorescein dye was applied on two fields. The first application of dye was made directly on a rock outcrop located in one of the fields, but the bulk of it was sprayed on the fields along with the tannery wastes. It is estimated that the point of application is located approximately 100 to 200 yards from the springs where the main portion of water emerges from the ground.

Approximately four months after the first application of dye on the fields, traces of fluorescein began to appear in the samples collected at the springs. When viewed under a "black" light, the samples exhibited a characteristic green tinge of fluorescent dyes. It is interesting to note that the samples taken from spring No.2 located nearly 150 feet from the main source did not show any traces of the dye at any time.

Shortly after the tannery management was informed of the above observations, they pointed out that some surface waters together with samples collected from other wells in the Acton area exhibited similar phenomenon when viewed under the "black" light.

Bacteriological Examination

In order to prove that fluorescent effects observed in the samples collected from the south springs were caused by the presence of fluorescein dye, samples of water collected from the springs and various sources within the Acton area were examined for the presence of fluorescent organisms. The general consensus of the OWRC bacteriologists was that there was a much greater number of these organisms in the surface water samples than in those from the south springs, and that fluorescent effect due to the organisms was not similar to that caused by the fluorescein. Also, it was observed that the population of these organisms was not sufficiently high enough in the samples from the south springs to cause any fluorescent effect.

Extension of Spray Irrigation Treatment - 1961

In 1961, Beardmore & Company extended its spraying irrigation facilities by utilizing a 90-acre farm. The farm is located south of Acton on the west side of Highway No.25 in the Township of Esquesing. Spraying of tannery waste on this farm commenced in the middle of August 1961. During the early stages,

wastes were sprayed only for 3 to 4 hours each afternoon, and this was continued until the arrival of colder weather in November. All of the spraying was confined to one area only. Spraying was carried out through one line equipped with 12 rotary sprayers.

Spraying operations in 1962 were extended to include a much wider area of perhaps 15 to 20 acres of this farm. An elaborate spray system was laid out on the fields intended for spray irrigation. The period of spraying was from 6:00 a.m. to 6:00 p.m., five days per week. At any given time, there were 24 sprayers in operation for a period of one to two hours and then shut off. By opening and closing of various valves, another set of 24 sprayers were placed into service. This mode of operation was followed over the entire spray area. These sprayers were tended by a tannery employee who lived in a house located on this farm.

During 1963, spraying was also carried out at this location.

Chloride Contamination of Private Wells

Since the tannery commenced its spraying operations in 1961 on the newly acquired property, samples have been collected at regular intervals from local farm wells and the laboratory results are included in the appended Table 2. The approximate locations of the wells are shown on sketch 1 which accompanies the results.

Two wells, Nos. 4 and 5, designated as Breen and Beardmore Farm show definite evidences of chloride contamination. The Beardmore Farm well, which is on the property receiving the wastes

and located approximately 200-300 feet from the spray area has indicated a significant increase in chlorides from below 10 ppm to 360 ppm. The chloride level remained under 12 ppm until June 1962 and then increased to 270 ppm during the first week of October 1962. After reaching this peak, the chloride level dropped to 45 ppm towards the end of November and to 35 ppm in December. In April 1963, the chloride concentration decreased to 32 ppm and then increased steadily until September when the last sample collected indicated 360 ppm.

The Breen well which is located opposite the north-east corner of the tannery's new property on the west side of Highway No.25 is also contaminated. The chloride content in this well reached higher levels more rapidly than in the Beardmore well although it is located at a greater distance from the spray area. Another interesting observation is that the chlorides in the Breen well have remained more constantly at higher levels.

Across Highway No.25 east of the Breen property(see sketch), there are fields where tannery wastes have been sprayed for a number of years. These fields are considered to be within the town limits. The Breen well is situated approximately 200 feet from this site. This well and the fields are in direct line with the Acton south springs located approximately 2000 feet away.

There are also other wells, namely Barnard, Porty and O'Rourke, situated on the west side of Highway No.25 to the north of

the Breen well. It is noted that the chloride levels in these wells do not show corresponding increases.

Since the spraying operations commenced at the new site, a Mr. Jocque has constructed a service station at the south-west corner of the intersection of Highway No.25 and Side Road No.25. A sample taken in September 1963 from this well, which was dug in 1963, showed a chloride content of 160 ppm. A sample collected in February 1964 indicated a chloride concentration of 320 ppm. The more recent sample was submitted by the Halton County Health Unit and was suspected of being contaminated with tannery wastes.

Pollution of Local Creek Traversing Appleyard Farm

The contour of the tannery property where spraying began in 1961 slopes gently away from Highway No.25. At the western limits of the property is located a swampy area which continues into Mr. Appleyard's farm. An intermittent watercourse extends along the line fence on Mr. Appleyard's side of the property line. This creek drains the swamp areas located on both farms and flows in a north-westerly direction traversing the Breen farm on the north side of the road. It is indicated on a topographical map of this area that the above mentioned creek empties into a swamp which is tributary to Fairy Lake. The latter is one of the upper reaches of Black Creek.

When the tannery began its programme of waste disposal west of Highway No.25, it was feared that there would be some surface run-off carrying waste contaminants into the creek. Samples were

collected on several occasions and the analyses indicated that the water in the creek was being polluted. The following table includes the chemical analyses of samples collected from the creek under discussion.

<u>Date Sampled</u>	<u>5-day BOD</u> (ppm)	<u>Chlorides</u> (ppm)	<u>Sodium</u> (ppm)
<u>1961</u>			
September 6	--	22	5
26	--	5	4
November 23	--	12	4
<u>1962</u>			
August 14	1.2	13	6.5
November 29	12	340	127
<u>1963</u>			
April 2	1.3	23	7.5
May 13	1.5	110	33
September 24	--	180	71

The samples collected during the latter part of 1962 and in 1963 show that saline material was entering the creek, as indicated by the marked increase in chlorides.

Court Action - September 1961

Subsequent to Beardmore & Company Limited commencing its disposal of tannery wastes on the recently acquired property, it was charged by the Township of Esquesing for violating a township by-law. This by-law prohibits the disposal of garbage, and industrial wastes within the township except at approved sites.

The presentation of insufficient proof that the discharged material was in fact an industrial waste evidently caused the magistrate to reason that this by-law "would prevent any farmer from spraying fertilizer on his land" and therefore the case was dismissed.

Discharge of Tannery Waste to Swamp

There is a low-lying area on the tannery property located approximately 200 yards north-west of the south springs. It appears that this area had been partly excavated and that a dyke was created to form a lagoon. Prior to 1959, this lagoon was used for impounding tannery wastes until the wastes were disposed of by spray irrigation on fields to the south. During 1960 and the early part of 1961, this lagoon was apparently inoperative.

Subsequent to the court case in September 1961, tannery wastes were again impounded in this lagoon. The wastes were retained for a few days and then discharged into a nearby swamp by means of a siphon. As previously mentioned, this swamp is tributary to Black Creek. After the lagoon was emptied, it would be re-filled with a fresh batch of wastes.

On a number of occasions during 1961 and 1962, Commission staff observed that the wastes were being siphoned out of the lagoon via a 1-1/2 inch diameter plastic pipe which was placed over the dyke wall. The flow from the pipe was estimated at 20 gpm. Tannery wastes were entering the lagoon on these occasions.

On August 28, 1962, a portable gasoline motor-driven pump was noted on the bank of the lagoon, suggesting it was used to augment the discharge of wastes into the swamp.

The analyses of the samples collected from this lagoon were indicative of tannery waste and are presented on the following page.

<u>Date Sampled</u>	<u>5-day BOD</u>	<u>Chlorides</u>	<u>Sodium</u>
	(ppm)	(ppm)	(ppm)
<u>1961</u>			
October 10	52	1926	1500
November 6	360	2646	1560
23	345	1906	1500
30	340	1900	1400
December 11	330	1956	1400
19	270	2246	1600
<u>1962</u>			
March 26	190	1196	--
April 10	22	376	--
June 15	28	1415	1280
July 17	48	2165	1280
August 14	27	1275	1090
28	25	2045	1400
November 3	78	1200	--
29	200	1300	1000
<u>1963</u>			
April 2	4.5	610	450
May 13	2.2	705	465
July 31	20	1900	1400
September 24	--	1620	1250

Comments

The waste disposal system serving Beardmore & Company Limited is not ideal considering that late springs and early freeze-ups can shorten the spray application period thus placing an added load on the storage lagoons. Wet summers can decrease the spray application rate, and atmospheric odours are a problem particularly during the months of July and August. A significant increase in the chloride content of the ground water in the area has resulted since the spraying began in 1946. The tannery wastes contain large quantities of inorganic salts such as sodium chloride, sodium sulphates, and those of calcium which are used as an integral part of processing hides into leather.

It is realized by the Commission that this tannery has a difficult and complex waste disposal problem. Tannery management also recognizes this fact, and continues to investigate measures for improving the waste disposal practices and for controlling odours.

Notwithstanding the above, the problems of preventing water pollution especially in the spring when the lagoons are in danger of overflowing, and of preventing or reducing the waste flows high in salt and sulphides from the spray irrigation system still must be solved.

(ii) H.K.Porter Company(Canada)Limited

This company, located at 125 McDonald Boulevard, is engaged in the manufacture of circular saws, saw blades, clutch facings, brake linings and refractories used for surface lining in furnaces, combustion chambers and pouring equipment. The plant employs 125 people.

The average daily water consumption is about 22,500 gallons, with the major portion of this water being used for cooling purposes on grinding wheels. Other uses include compressor cooling and make-up water in the formation of refractory materials.

Wastes from this plant are made up of the cooling water from the grinding wheels, wash-up water from the area where the refractories are mixed and also the periodic discharge of batches of soluble cutting oil used for cooling purposes on several small grinders.

The grinding wastes are settled in a basin below floor level to remove the emery suspension and the wash-up waters from the refractory mixing area are also settled in a baffled tank. The effluents from both tanks and the compressor cooling water discharge to a building sewer. The latter is tributary to a ditch and Black Creek. The batch dumps of soluble cutting oil are discharged to the sanitary sewer which serves the plant.

Comments

The proper operation of the settling facilities inside the plant, together with efforts to insure that no soluble cutting oils are discharged to the storm sewer system, should result in an acceptable effluent being discharged from this plant.

2. Storm Sewer Outlets

(i) CRSB- 33.1 W-2 - 10" diameter storm sewer, Main St. - north-east side of bridge.

A flow estimated at 1.5 gpm was discharging from this sewer outlet at the time of sampling.

Attention is drawn to the excessive biochemical oxygen demand and suspended solids contents of the discharge collected from this outlet.

Comments

The cause of the adverse analysis should be determined and remedial action taken.

(ii) CRSB- 33.1 W-3 - 8" diameter storm sewer, Main St. - south-west side of bridge.

A flow estimated at 0.5 gpm was discharging from this sewer on September 17, 1963.

The coliform content of the discharge from this sewer was excessive.

Comments

The reason for the high count should be investigated and subsequent remedial action effected.

3. Accumulation of Debris

A considerable portion of Black Creek throughout Acton is littered with wood debris.

Part of this debris may have resulted from decayed trees in Fairy Lake.

CONCLUSION

Pollution associated with the Town of Acton appears to be caused mainly by wastes from (1) the Beardmore & Company Limited property, (2) the Acton water pollution control plant, and (3) two storm sewer outlets terminating at the intersection of Black Creek and Main Street(south).

RECOMMENDATIONS

1. The operation of the Acton water pollution control plant should be maintained to meet OWRC effluent objectives.
2. Beardmore & Company Limited should continue to investigate measures for improving its waste treatment facilities until a satisfactory solution is found. The possibility that the

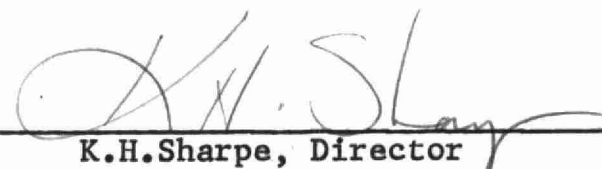
treatment of tannery wastes by spray irrigation may seriously affect additional ground-water supplies should be carefully considered in view of what has already occurred.

3. The cause of the adverse analyses of the samples from the storm sewers previously mentioned should be determined and remedial action taken.

All of which is respectfully submitted,

District Engineer: 

H. Browne, P.Eng.

Approved by: 

K.H. Sharpe, Director

Prepared by: P.J. Walsh
A. Oda
D.P. Caplice

TABLE 1-1

OUTFALL TABULATION AND ANALYTICAL RESULTS

ALL ANALYSES EXCEPT PH REPORTED
IN PPM UNLESS OTHERWISE INDICATED

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML MF	5-DAY BOD	TOTAL	SOLIDS		TURBID- ITY	PHENOLS PPB	PH	TANNINS	ALKALINITY
						SUSP.	DISS.					
CRSB- 31.6	BLACK CREEK AT THIRD LINE (ESQUESING TWP.)	SEPT. 13/61	420	4.7	728	-	-	3	-			
		JUNE 7/62	2,200	7.2	764	-	-	2.3	-			
		JULY 23/62	59,000	18	-	-	-	9	-			
		SEPT. 11/62	900	6.4	942	-	-	3.1	-			
		FEB. 20/63	134,000	5.6	852	-	-	5.5	-			
		MAY 1/63	9,500	5.7	504	9	495	-	-			
		SEPT. 17/63	8,700	4.8	1054	2	1052	-	10			
		SEPT 28/64										
CRSB- 32.1	BLACK CREEK DOWNSTREAM FROM BEARDMORE & CO. LTD. TRIBUTARY	OCT. 30/62	--	14	682	-	-	8	-			
		FEB. 19/63	41,000	9.2	-	-	-	-	8			
		MAY 13/63	--	8.3	508	494	14	-	7.9			
		SEPT. 17/63	24,300	5.6	966	6	960	-	-			
CRSBT- 32.2	BEARDMORE & CO. LTD. TRIBUTARY	SEPT. 13/61	23,000	7.6	2262	-	-	7	-			
		JUNE 7/62	600	7.2	2126	-	-	5.5	-			
		SEPT. 11/62	740	7.1	2010	-	-	4.5	-			
		OCT. 30/62	530	92	2476	-	-	12	-			
		FEB. 19/63	--	4.4	-	-	-	-	10			
		MAY 13/63	--	7.4	1992	1973	19	-	7.8			
		* AUG. 28/63	7,200	7.6	2744	38	2706	-	-	7.8	8	556
		SEPT. 17/63	600	4.6	2672	6	2666	-	-	7.7	4	532

* THIS PARTICULAR SAMPLE WAS COLLECTED FROM THE
HOLDING POND OUTLET SEWER.

TABLE 1-2

OUTFALL TABULATION AND ANALYTICAL RESULTS

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML MF	5-DAY BOD	SOLIDS			TURBIDITY
					TOTAL	SUSP.	DISS.	
CRSB- 32.2	BLACK CREEK	SEPT.13/61	20	5.1	490	-	-	2
	DOWNSTREAM FROM	JUNE 7/62	620	3.0	572	-	-	7.5
	ACTON WATER POLLUTION	SEPT.11/62	5,400	14.0	698	-	-	10.0
	CONTROL PLANT	OCT.30/62	30	4.4	418	-	-	6.5
	OUTFALL AND	MAY 13/63	-	7.4	342	332	10	-
	UPSTREAM FROM	SEPT.17/63	173,000	5.2	618	3	615	-
	BEARDMORE & Co.LTD. TRIBUTARY							
CRSB- 32.3 T	15" Ø OUTFALL	SEPT.13/61	2	4.0	528	16	512	-
	SEWER - ACTON	JUNE 7/62	6	5.6	548	8	540	-
	WATER POLLUTION	SEPT.11/62	200	29.0	642	68	574	-
	CONTROL PLANT(WPCP)	OCT.30/62	20	31	560	21	539	-
		SEPT.17/63	223,000	13	522	3	519	-
CRSB- 32.3	BLACK CREEK JUST	SEPT.13/61	1,100	1.3	480	-	-	2
	UPSTREAM FROM	JUNE 7/62	> 10	2.8	566	-	-	3.6
	ACTON WPCP OUTFALL	SEPT.11/62	3,900	3.8	684	-	-	2.3
		OCT.30/62	570	4.6	400	-	-	3.5
		MAY 13/63	-	3.7	328	317	11	-
		SEPT.17/63	1,900	2.0	698	2	696	-

TABLE 1-3

OUTFALL TABULATION AND ANALYTICAL RESULTS

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML MF	5-DAY BOD	SOLIDS			TURBIDITY
					TOTAL	SUSP.	DISS.	
CRSB- 33.0 W	15" ϕ STORM SEWER - WILLOW ST.	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.0 R	8" ϕ RELIEF SEWER AGNES ST. SEWAGE PUMPING STATION(SPS)	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.0 R-2	8" ϕ RELIEF SEWER AGNES ST.(SPS)	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.1	BLACK CREEK AT MAIN ST. S. END OF ACTON	SEPT.13/61	530	1.2	378	-	-	2
		JUNE 7/62	1,520	1.5	366	-	-	4.0
		SEPT.11/62	17,300	12.0	368	-	-	3.8
		SEPT.17/63	22,800	0.7	430	2	428	-
CRSB- 33.1 W	18" ϕ STORM SEWER MAIN ST. N.E. SIDE OF BRIDGE	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.1 W-2	10" ϕ STORM SEWER MAIN ST. N.E. SIDE OF BRIDGE	SEPT.17/63	8	140	594	54	540	

TABLE 1-4

OUTFALL TABULATION AND ANALYTICAL RESULTS

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML MF	5-DAY BOD	TOTAL	SOLIDS		TURBIDITY
						SUSP.	DISS.	
CRSB- 33.1 W-3	8" ϕ STORM SEWER MAIN ST. S.W. SIDE OF BRIDGE	SEPT. 17/63	1,800,000	0.8	132	2	130	
CRSB- 33.1 W-4	12" ϕ STORM SEWER MAIN ST. N.W. SIDE OF BRIDGE	SEPT. 17/63	FLOW INSUFFICIENT FOR SAMPLING					
CRSB- 33.1 W-5	8" ϕ STORM SEWER BROCK ST.	SEPT. 17/63	FLOW INSUFFICIENT FOR SAMPLING					
CRSB- 33.1 W-6	8" ϕ STORM SEWER BROCK ST.	SEPT. 17/63	FLOW INSUFFICIENT FOR SAMPLING					
CRSB- 33.1 W-7	12" ϕ STORM SEWER BROCK ST.	SEPT. 17/63	NO FLOW NOTED					
CRSB- 33.1	BLACK CREEK AT BROCK ST.	SEPT. 17/63	5,400	5.4	402	3	399	
CRSB- 33.2 W	8" ϕ STORM SEWER CHURCH ST.	SEPT. 17/63	NO FLOW NOTED					

TABLE 1 - 5

OUTFALL TABULATION AND ANALYTICAL RESULTS

<u>SAMPLING POINT NO.</u>	<u>LOCATION</u>	<u>DATE EXAMINED</u>	<u>COLIFORMS PER 100 ML MF</u>	<u>5-DAY BOD</u>	<u>SOLIDS TOTAL</u>	<u>SUSP.</u>	<u>DISS.</u>	<u>TURBIDITY</u>
CRSB- 33.2 W-2	10" ϕ STORM SEWER- MILL ST.	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.2 W-3	12" ϕ STORM SEWER MILL ST.	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.2	BLACK CREEK AT MILL ST.	SEPT.17/63	700	0.9	366	3	363	
CRSB- 33.3 W	8" ϕ STORM SEWER MILL ST. & VICTORIA AVE.	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.9 W	15" ϕ STORM SEWER ELIZABETH DR. & JEFFREY AVE.	SEPT.17/63	NO FLOW NOTED					
CRSB- 33.9 R	12" ϕ RELIEF SEWER ELIZABETH DR. SEWAGE PUMPING STATION	SEPT.17/63	NO FLOW NOTED					
CRSBTA- 33.9	BLACK CREEK(FAIRY LAKE) TRIBUTARY A AT ELIZABETH DRIVE	SEPT.18/63	38	1.1	394	2	392	

TABLE 1 - 6

OUTFALL TABULATION AND ANALYTICAL RESULTS

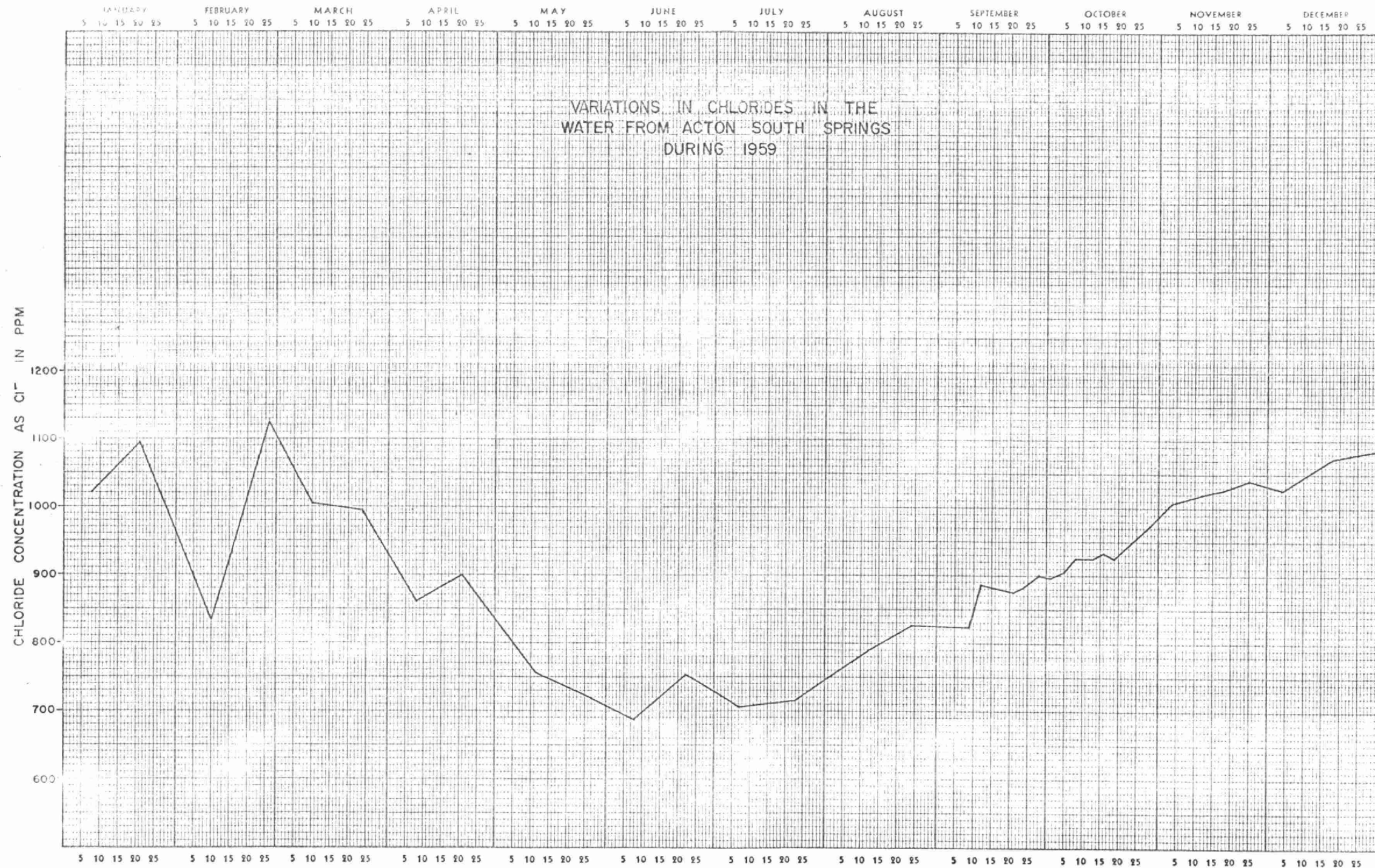
<u>SAMPLING POINT No.</u>	<u>LOCATION</u>	<u>DATE EXAMINED</u>	<u>COLIFORMS PER 100 ML</u>	<u>5-DAY</u>	<u>TOTAL</u>	<u>SOLIDS</u>		<u>TURBIDITY</u>
			<u>MF</u>	<u>BOD</u>		<u>SUSP.</u>	<u>DISS.</u>	
CRSB- 34.0	BLACK CREEK UPSTREAM FROM INLET TO FAIRY LAKE	SEPT. 18/63	6300	3.6	240	14	226	
CRSBTB- 34.0	BLACK CREEK TRIBUTARY B- DOWN- STREAM FROM MAIN ST.	SEPT. 18/63	0	1.2	552	3	549	
CRSB- 34.0 W	9" ϕ STORM SEWER - MAIN ST.	SEPT. 18/63	NO APPARENT FLOW - OUTLET PARTLY SUBMERGED					
CRSB- 34.0 W-2	12" ϕ STORM SEWER - MAIN ST.	SEPT. 18/63	NO APPARENT FLOW - OUTLET PARTLY SUBMERGED					
CRSB- 34.01 $\frac{1}{2}$	BLACK CREEK - MAIN ST. (N.W. END OF ACTON)	SEPT. 18/63	27	2.8	246	14	232	
CRSB- 34.1 W	8" ϕ STORM SEWER - WILLOW ST.	SEPT. 18/63	NO FLOW NOTED					

TABLE 1-7

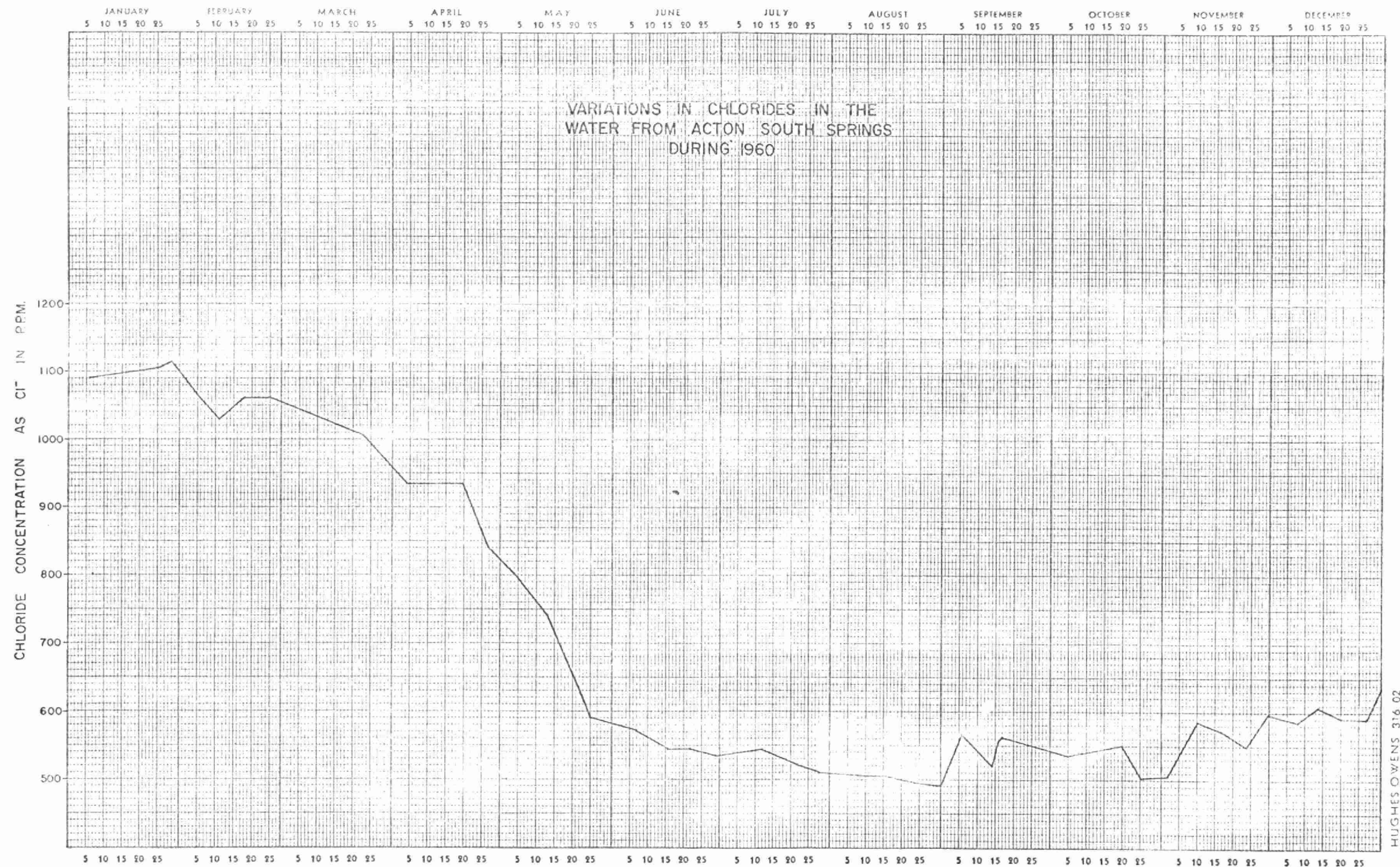
OUTFALL TABULATION AND ANALYTICAL RESULTS

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML MF	5-DAY BOD	SOLIDS		DISS.	TURBIDITY	ETHER SOLUBLES
					TOTAL	SUSP.			
CRSB- 34.3 W	12" Ø STORM SEWER SOUTH SIDE OF CNR TRACKS	SEPT.18/63	NO FLOW NOTED						
CRSBTC- 34.4	BLACK CREEK - TRIBUTARY C DOWNSTREAM FROM WALLACE ST.	SEPT.18/63	FLOW INSUFFICIENT FOR SAMPLING						
CRSBTC- 34.4 W	12" Ø STORM SEWER - WALLACE ST.	SEPT.18/63	NO FLOW NOTED						
CRSBTC- 34.4 W-2	12" Ø STORM SEWER - WALLACE ST.	SEPT.18/63	NO FLOW NOTED						
CRSBTC- 34.7 W	24" Ø STORM SEWER - ACTON BLVD.	SEPT.18/63	NO FLOW NOTED						
CRSB- 34.5 I	18" INDUSTRIAL SEWER- H.K.PORTER CO.(CANADA)LTD.	AUG.28/63 SEPT.18/63	132 2,300	0.9 1.4	342 674	4 3	338 671	-- --	0 -
CRSB- 34.5	BLACK CREEK- UPSTREAM FROM McDONALD BLVD.	SEPT.18/63	78	1.4	194	2	192		

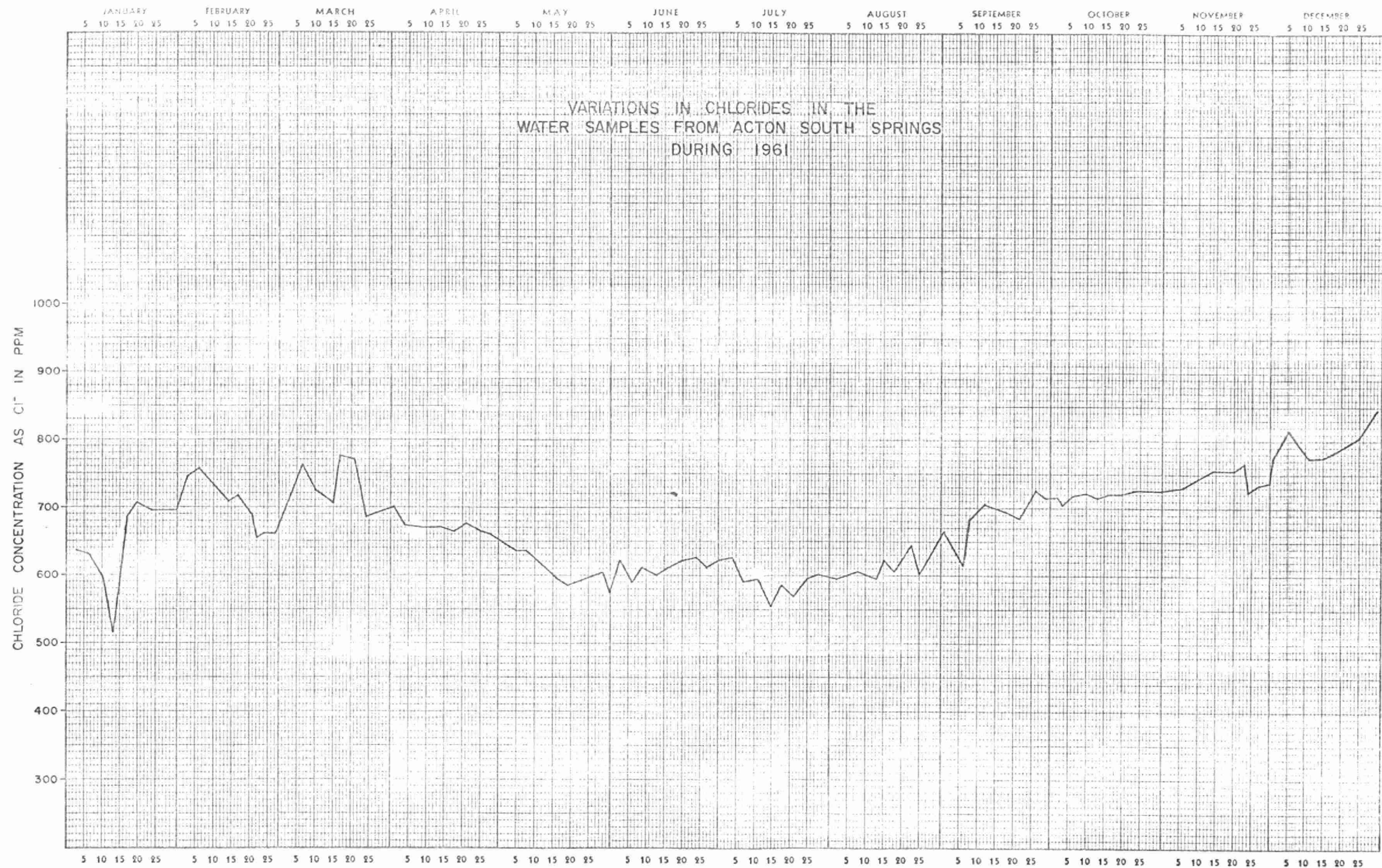
GRAPH I



GRAPH 2



GRAPH 3



GRAPH 4

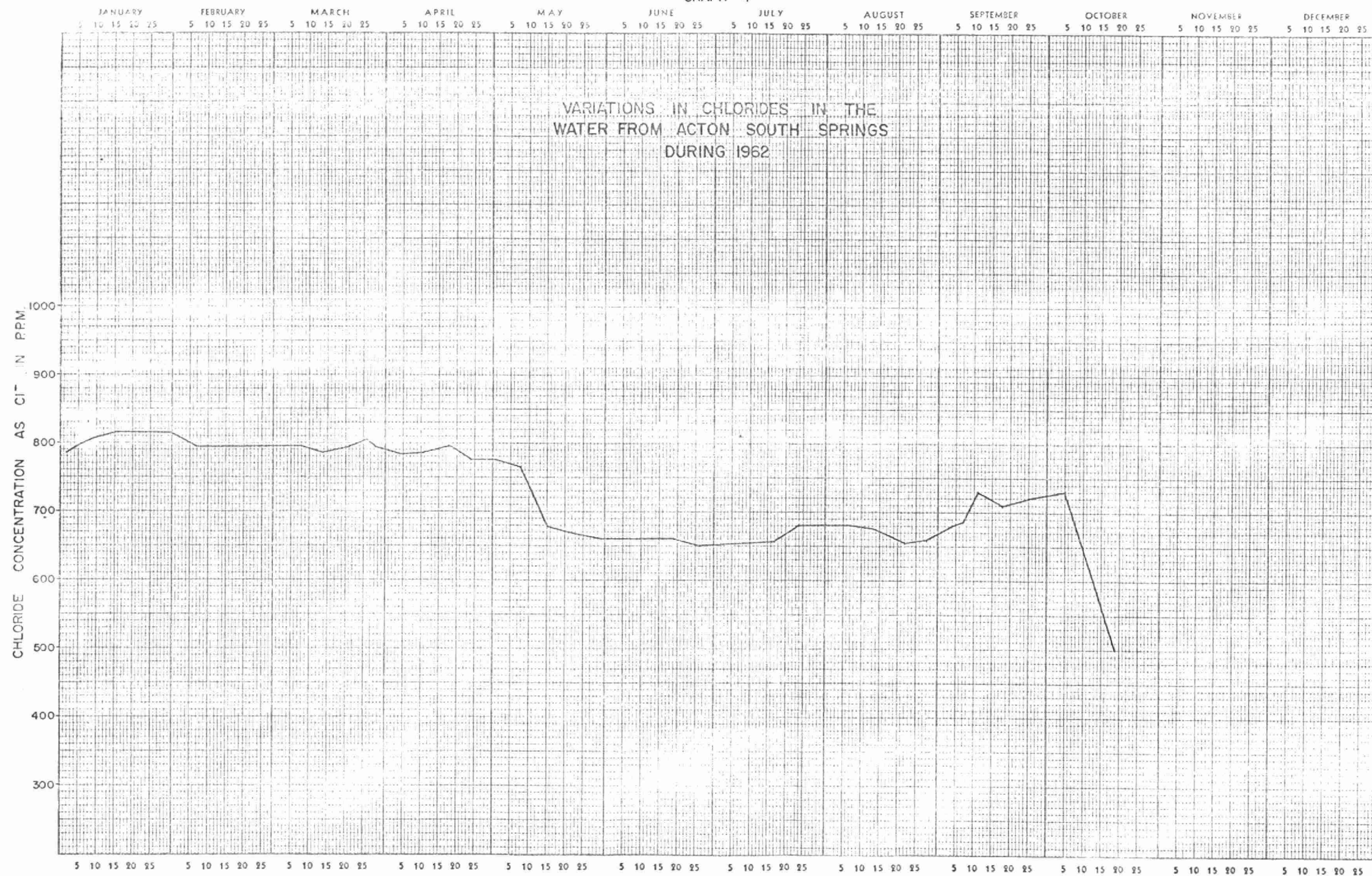


TABLE 2-1

SUMMARY OF CHLORIDE AND SODIUM ANALYSES IN THE WATER FROM WELLS LOCATED IN
THE VICINITY OF FIELDS USED FOR SPRAYING TANNERY WASTES

ALL RESULTS ARE REPORTED IN PPM

LOCATION OF WELL APPROX. DEPTH (FT.) DATE SAMPLED	O'ROURKE 25		PORTY 35		BARNARD 25-35		BREEN 44		BEARDMORE FARM 15-30		APPLEYARD 57		FLYNN 30		JOHN HARRIS 89		THOS. HARRIS 60-70	
	Cl	Na	Cl	Na	Cl	Na	Cl	Na	Cl	Na	Cl	Na	Cl	Na	Cl	Na	Cl	Na
1961																		
AUGUST 23							7	5			2	1.5			6	4.2	1	2
AUGUST 29							19	4.2			2	1.7			6	4.2		
SEPTEMBER 6	13	9					16	4	11	7	2	1	1	1	7	2	0	1
SEPTEMBER 12	9	5	51	29			18	3.9	7	4	3	1.5	1	2	5	3		
SEPTEMBER 18	9	4.5	-	-					7	3.9			3	1				
SEPTEMBER 26	9	4.7	63	35					6	4	4	1	2	1	5	4	TRACE	1
OCTOBER 3	-	-	-	-					6	4								
OCTOBER 10	10	5.4	67	34.5					6	4.2	2	1	3	1	6	4.6		
OCTOBER 16	9	5	68	37			20	4.5	7	5	3	1.5	2	1.5	5	4	2	1.5
OCTOBER 23	9	4	68	34	24	8.5			8	4			3	2	7	4		
NOVEMBER 6			74	37	23	41	20	3	6	3	4	1	2	1	6	2	2	1
NOVEMBER 16	10	4.6	76	38	23	29			6	4.1								
NOVEMBER 30	15	5	87	45	27	27	17	2	8	2								
DECEMBER 11	19	10.5	82	41			16	1	7	1	3	1	TRACE	1	5	3		
DECEMBER 18	12	8	77	40	28	22	18	5	5	5			TRACE	1				
DECEMBER 27			81	37.5					6	4					5	3.5	2	2

TABLE 2-2

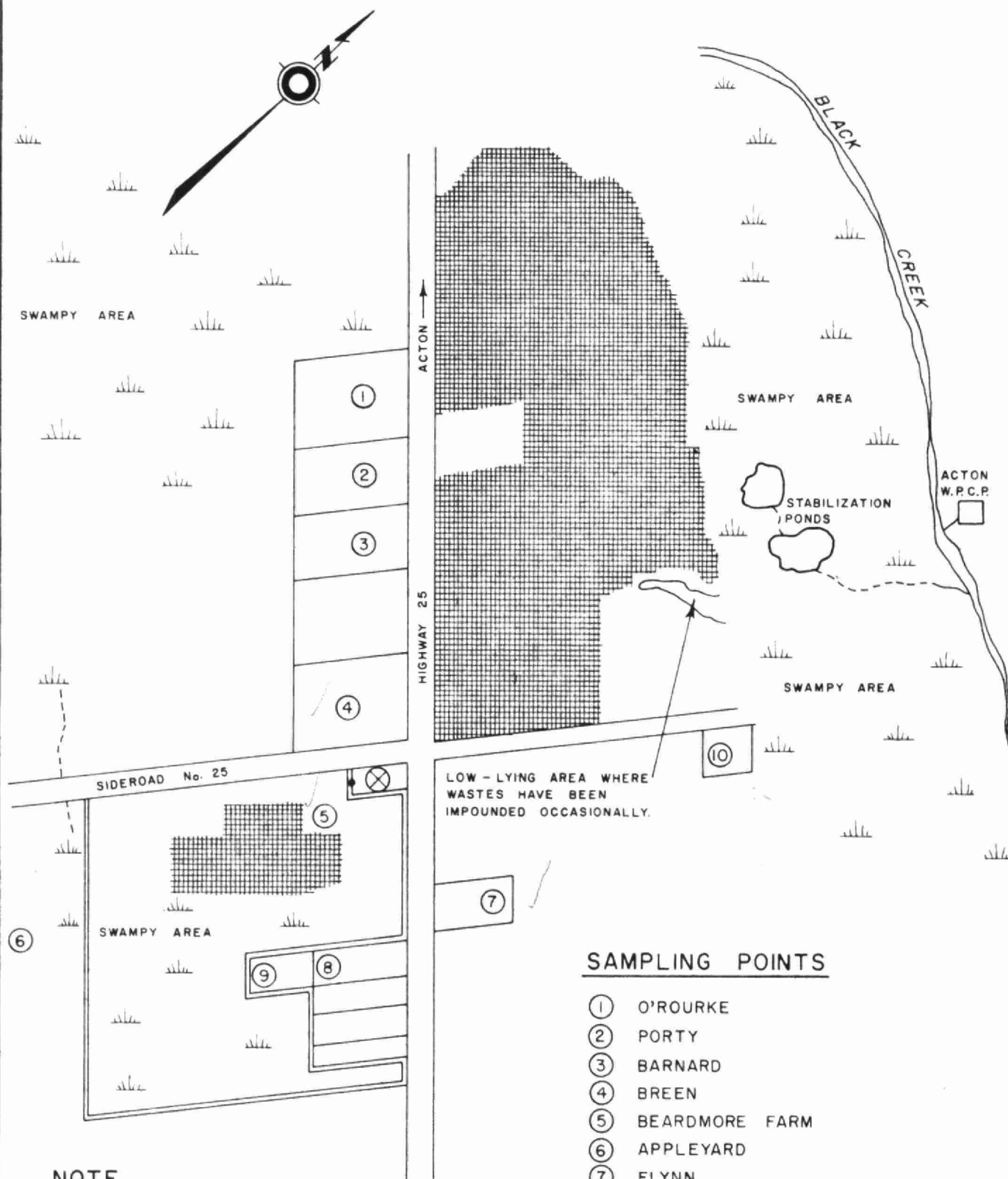
LOCATION OF WELL APPROX. DEPTH (FT.)	O'ROURKE 25		PORTY 35		BARNARD 25-35		BREEN 44		BEARDMORE FARM 15-30		APPLEYARD 57		FLYNN 30		JOHN HARRIS 89		THOS. HARRIS 60-70	
DATE SAMPLED	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA
1962																		
JANUARY 9	10	4	74	39	27	14	20	4	5	4	-	-	-	-	5	4	-	-
JANUARY 22	11	5	73	35	27	16	-	-	5	4	-	-	-	-	5	4	2	3
FEBRUARY 7	9	4	71	36	26	14	21	4	9	8	-	-	-	-	-	-	-	-
FEBRUARY 27	8	4	64	34	25	13	-	-	5	5	-	-	-	-	4	3	-	-
MARCH 14	10	3	69	31	-	-	20	4	6	4	-	-	-	-	-	-	-	-
MARCH 26	35	16	58	25	-	-	22	5	8	11	9	1	-	-	8	5	-	-
APRIL 10	28	13	54	27	33	18	-	-	11	8	-	-	-	-	-	-	-	-
MAY 8	17	8	56	27	31	15	109	15	5	5	-	-	2	2	6	4	2	2
JUNE 15	9	5	65	34	28	16.5	-	-	10	5	-	-	3	2	6	4	3	2.5
JULY 17	9	4	65	32	30	15	73	11	33	4	4	2	-	-	5	4	3	2
AUGUST 14	12	5.4	77	37	36	16.5	60	10	69	10	-	-	3	2	4	3.8	4	2.4
AUGUST 28	10	4	71	33	34	16	-	-	76	12	3	2	-	-	6	4.3	6	4.3
SEPTEMBER 7	8	3.9	74	37	34	16	51	8.9	91	15	-	-	-	-	8	4.3	3	2
OCTOBER 5	14	5.9	88	43.5	42	20	49	8.5	270	57.5	-	-	8	2	9	4.6	6	2
OCTOBER 19	16	8	84	41	48	27	51	9.6	131	30	-	-	3	2.5	10	5.8	6	2.6
NOVEMBER 3	28	9.1	83	38	54	27	98	17.8	106	28	-	-	-	-	13	4.6	8	2
NOVEMBER 29	17	9.7	67	36	-	-	189	43	45	14	6	2	6	2	7	4.3	4	1.5
DECEMBER 26	16	9.4	66	33	43	21	344	92	35	8.9	4	2	2	2	4	4	2	2

TABLE 2-3

LOCATION OF WELL APPROX. DEPTH (FT.) DATE SAMPLED	O'ROURKE 25		PORTY 35		BARNARD 25-35		BREEN 44		BEARDMORE FARM 15-30		APPLEYARD 57		FLYNN 30		JOHN HARRIS 89		THOS. HARRIS 60-70	
	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA	CI	NA
<u>1963</u>																		
JANUARY 30	72	35	12	5	43	19	340	74	91	24	2	2	4	2	5	3.5	3	1.5
FEBRUARY 27	10	4	-	-	-	-	274	77	122	36	-	-	3	2	5	4	3	2
APRIL 2	31	16	52	25	51	21	238	57	32	11	-	-	-	-	6	5	4	2.5
MAY 13	21	11	70	28	50	15	275	66	70	17	6	1	5	2	7	3.5	4	1.5
JUNE 18	18	8	72	33	-	-	340	86	275	31	19	1	-	-	34	4	-	-
JULY 31	15	10	69	39	49	25	230	70	224	90	-	-	-	-	-	-	-	-
SEPTEMBER 24	10	2	23	46	52	24	43	11.5	360	150	5	2	-	-	19	5	10	2

SKETCH I

APPROXIMATE LOCATIONS OF SOUTH SPRINGS AND PRIVATE WELLS WITH
RESPECT TO THE FIELDS USED FOR DISPOSAL OF TANNERY WASTES



NOTE

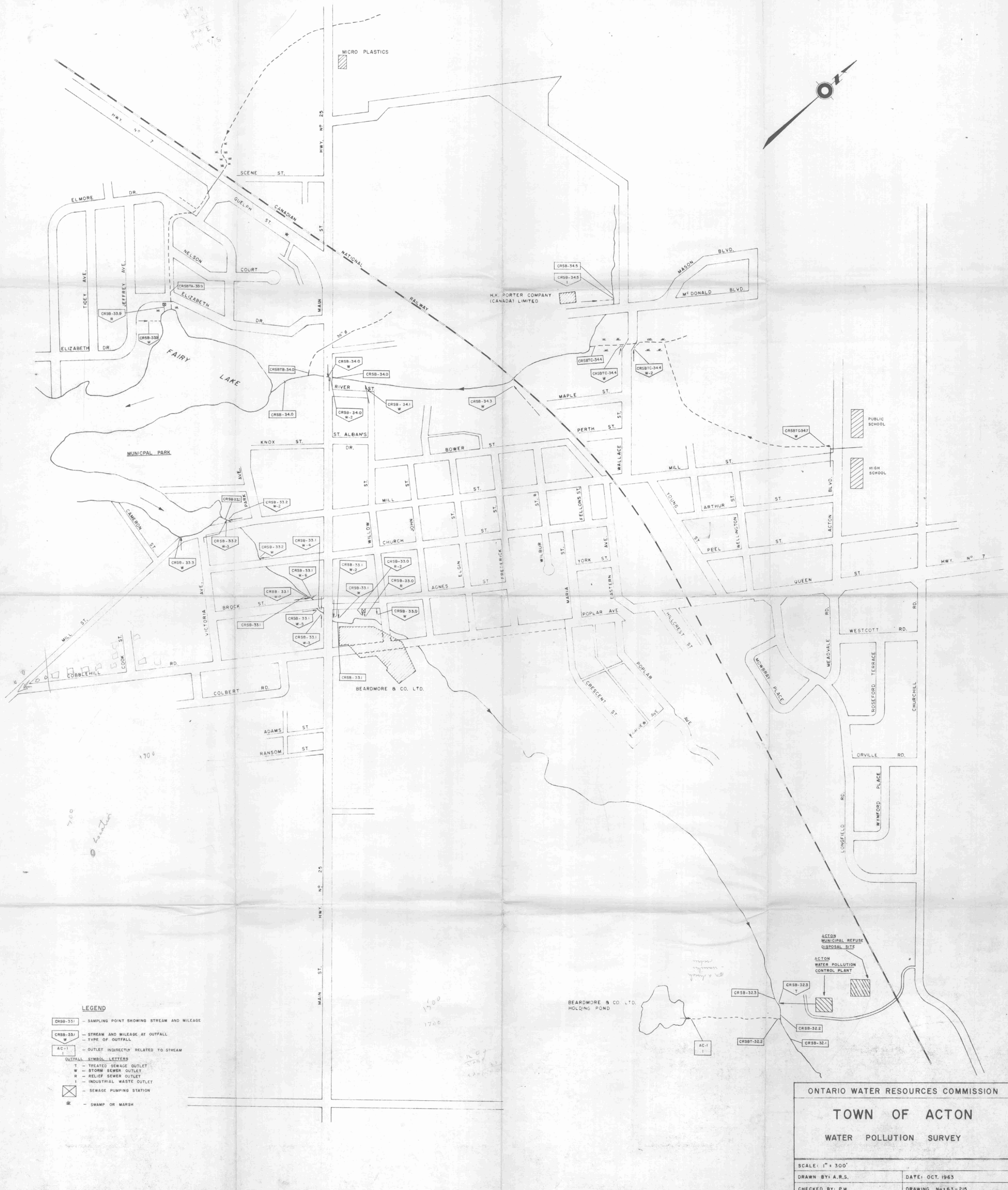
----- DENOTES INTERMITTENT STREAM

SHADED PORTIONS INDICATE AREAS
USED FOR SPRAY IRRIGATION

THIS MAP IS NOT TO SCALE.

SAMPLING POINTS

- ① O'ROURKE
- ② PORTY
- ③ BARNARD
- ④ BREEN
- ⑤ BEARDMORE FARM
- ⑥ APPLEYARD
- ⑦ FLYNN
- ⑧ JOHN HARRIS
- ⑨ THOMAS HARRIS
- ⑩ SOUTH SPRINGS
- ⊗ JOCQUE



LEGEND

- CRSB-331 - SAMPLING POINT SHOWING STREAM AND MILEAGE
- CRSB-331 - STREAM AND MILEAGE AT OUTFALL
- AC-1 - OUTFALL INDIRECTLY RELATED TO STREAM
- OUTFALL SYMBOL LETTERS
 - T - TREATED SEWAGE OUTFALL
 - W - STORM SEWER OUTFALL
 - R - RELIEF SEWER OUTFALL
 - I - INDUSTRIAL WASTE OUTFALL
- SEWAGE PUMPING STATION
- SWAMP OR MARSH

ONTARIO WATER RESOURCES COMMISSION

TOWN OF ACTON

WATER POLLUTION SURVEY

SCALE: 1" = 300'

DRAWN BY: A.R.S.

DATE: OCT. 1963

CHECKED BY: P.W.

DRAWING No. 63-215